1-1-1974

Review of terminology and recent research related to handwriting problems

Franklin C. Wendt

A REVIEW OF TERMINOLOGY AND RECENT RESEARCH RELATED TO HANDWRITING PROBLEMS

by

Franklin C. Wendt

A RESEARCH PAPER

SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS IN EDUCATION

(EDUCATION OF LEARNING DISABLED CHILDREN)

AT THE CARDINAL STRITCH COLLEGE

Milwaukee, Wisconsin

1971

This research paper has been approved for the Graduate Committee of the Cardinal Stritch College by

Sister Joanne Marie Kuebler
(Advisor)

Date May 16, 1974

CONTENTS

Introduction

Persons involved in the education of exceptional children find that they have a special vocabulary of terms and expressions which are as unique to them and their profession as other professions or businesses have a vocabulary peculiarly their own. In the realm of learning disabilities, one finds such terms as dysphasia, dyslexia, perceptual motor impairment, neurological impairment, dyspraxia and many more. A term which one encounters less frequently, and which has caused some confusion as to its exact definition, is dysgraphia, thus leaving the teachers or professionals, who have direct contact with a student, at a loss as to whether or not the students with whom they are working can be classified as having dysgraphia. The first purpose of this paper is to make clear the meaning of this term.

The definitions of dysgraphia appear to fall into two areas: in one area dysgraphia is seen as a visual-motor problem in which the execution of letters is handicapped; in another area, dysgraphia is seen as a difficulty in expressing ideas with written symbols. Among those who see dysgraphia as a handwriting problem are Myklebust[1] and Waugh and Bush[2] who consider dysgraphia as a visual-motor problem, a type of apraxia. Lerner

---

[1]Helmer R. Myklebust, Development and Disorders of Written Language, Vol. II, Studies of Normal and Exceptional Children (New York: Grune & Stratton, 1973), p. 199.

[2]Kenneth W. Waugh and Wilma Jo Bush, Diagnosing Learning Disorders (Columbus, Ohio: Charles E. Merrill, 1971), p. 20.

also sees dysgraphia as a handwriting problem involving visual-motor function.[3]

Gerstman, on the other hand, uses the terms verbal agraphia to indicate problems involving the writing of words, and literal agraphia to indicate impaired writing of letters.[4] Frierson and Barbe also view dysgraphia as a "partial inability to express ideas by means of writing or written symbol."[5]

Verbal dysgraphia, being able to write letters correctly, but unable to put them together to form words, is a disorder in spontaneous writing, in copying and in taking dication.[6] An example is the case of the sixth grade boy who drew, in detail, a well proportioned drawing of a steam engine, including the power source and mechanical output. The only problem was that he misspelled every labeled part. For example, he wrote "value" for "valve," "peston" for "piston" and "gage" for "gauge."[7]

Literal dysgraphia, or dysgraphia as defined by Myklebust,[8]

---

[3]Janet W. Lerner, Children With Learning Disabilities (Boston: Houghton Mifflin Company, 1971), p. 188.

[4]A.L. Benton, Right-Left Discrimination and Finger Localization Development and Pathology (New York: Paul C. Hosbner Co., 1959), p. 111.

[5]Edward C. Frierson and Walter B. Barbe, Educating Children with Learning Disabilities: Selected Readings (New York: Appleton-Century-Crofts, Meredith Corporation, 1967), p. 491.

[6]Benton, op.cit., p. 111.

[7]George W. Brown, "Words and Things," Journal of Learning Disabilities, V (December, 1972), 574.

[8]Doris J. Johnson and Helmer R. Myklebust, Learning Disabilities (New York: Grune & Stratton, 1967), p. 199

Learner,[9] and Waugh and Bush,[10] is the impaired writing of letters. This includes not being able to maintain a horizontal line and occillating irregular movements.[11] Some common writing difficulties in this line are: inversion - this is where letters are written upside down;[12] for example a p is written for a b. Rotation is a problem where the letters are rotated as in c for n.[13] Mirror writing is a well known form of dysgraphia. This disorder is almost totally restricted to left-handed children and is identified by the inverted upside down writing which can be read by holding a mirror up to the page. By looking into the mirror the word or message can be read.[14] One unusual aspect of mirror writing is that it produces a neat, legible script which is superior to the production possible by any other standard writing styles.[15] It has also been found that more verbal children, those having greater ability to learn and code language, are less likely to have mirror image.[16]

---

[9]Janet W. Learner, Children With Learning Disabilities (Boston: Houghton Mifflin Company, 1971), p. 188.

[10]Waugh and Bush, op. cit., p. 20.

[11]Benton, op.cit., p. 111.

[12]A. Bannatyne, "Mirror-Images and Reversals," Academic Therapy, VIII (Fall, 1972), 87.

[13]Ibid.

[14]Frank Benson, M.D., "Graphic Orientation Disorders of Left Handed Children," Journal of Learning Disabilities, III (March, 1970), 131.

[15]Ibid.

[16]Bannatyne, op.cit., p. 88.

Other signs of literal dysgraphia, or handwriting problems, are: (1) immature drawings; (2) irratic, malformed, possibly spidery handwriting; (3) awkwardness, clumsiness; (4) tone deafness; (5) slurred, imprecise articulation; (6) emotional disturbances.[17]

In seeking an explanation or solution to dysgraphia, one finds that recent literature in the various professional periodicals makes no mention of dysgraphia. The question arises, is dysgraphia a forgotten disability, or has the disability found a new label? The later would seem to be the case. Exceptional education is under going many changes and advances. One of these changes has to do with the way in which exceptional children are labeled. In the past, many of the labels used by educators were labels acquired from other professions, that is, non-educators. Educators have now decided that many such terms are no longer adequate or acceptable. Thus, rather than totally disregarding the old terms, which have their place in extra-educational circles and which provide a viable means of communication with other professions, the educators have begun to replace these terms with "educationally useful and relevant descriptive terms once the child crosses the classroom threshold."[18]

---

[17]Alexander Bannatyne, Lanuage, Reading and Learning Disabilities, Psychology, Neuropsychology, Diagnosis and Remediation (Springfield, Illinosis: Charles C. Thomas Co., 1971), p. 431.

[18]Frank Hewett, Education of Exceptional Learners (Boston: Allyn and Bacon, Inc., 1974), p. 383.

In this case, the term dysgraphia is being replaced by the expression: handwriting problems. Here dysgraphia is what Gerstmann calls "literal agraphia."[19] In other words, the expression, handwriting problems, means difficulty in the actual execution of letters. It is this type of dysgraphia with which this paper is concerned, and the second purpose of this paper is to review what recent research has been done toward finding solutions to the various types of handwriting problems.

---

[19]A.L. Benton, op.cit., p. 111.

CHAPTER II

RECENT RESEARCH

In the teaching of handwriting to learning disabled children, one issue which has caused much controversey is whether one should begin instruction with cursive or manuscript writing. Myklebust and Johnson contend that manuscript is easier for the dysgraphic child, because the movements are simpler, there are fewer letter changes, and the same symbols are used in reading.[20] Other authorities prefer the cursive writing for several reasons. By beginning with cursive writing, there is no problem of having to change from one writing form to another. Cursive is also credited with minimizing spatial orientation problems and elementary reversal errors.[21]

There is now another writing style which appears to incorporate the advantages of both cursive and manuscript and is designed to specifically meet the needs of children with learning disabilities. In the Fall, 1970 issue of Teaching Exceptional Children, Florence Joseph and June Mullins present a modified script which was originally developed for use with perceptually handicapped children at the Home for Crippled Children in Pittsburg and was adapted from a form generally taught in Denmark.[22] Some of

---

[20]Johnson and Myklebust, op.cit., p. 213.

[21]Lerner, opcit., p. 190.

[22]Florence Joseph and June Mullins, "A Script to Supplant Cursive Writing or Printing," Teaching Exceptional Children, XII (Fall, 1973), 23.

the characteristics of the script were: (1) The script should be flowing and connected as in cursive, yet approximate book print as close as possible.[23] (2) Some letters were modified to make them more identifiable or easier to execute.[24]

This model script received continued development and in the May 1972 issue of the Journal of Learning Disabilities this script was again presented with a detailed explanation of its various characteristics.[25] Briefly, these characteristics are: (1) This handwriting model eliminates much of the difference between book print and handwriting. (2) This model is simplified, eliminating all unnecessary strokes which might distract a child. (3) This model's slant encourages flow and stresses directionality. (4) This model requires as little motor learning as necessary, with every word beginning with a downstroke and all rounded letters made nearly circular. The following is an example of the model script:

Upper case ABCDEFGHIJKLMNOPQRSTUVWXYZ

Lower case  [26]

This model script is not the first attempt to combine the best of manuscript and cursive. There have been other handwriting styles with such labels as manu-cursive[27] and joined manuscript.[28] Cursive writing

---

[23] Ibid., p. 30.

[24] Ibid., p. 31.

[25] June Mullins, et al. "A Handwriting Model for Children with Learning Disabilities," Journal of Learning Disabilities V (May, 1972), 310.

[26] Ibid., p.

[27] Norman Levine and Joan Carter, "Handwriting for the Learning Disabled," in Building Handwriting Skills in Dyslexic Children, ed. by John I. Arena (San Rafael, California: Academic Therapy Pub., 1970), p. 19.

[28] Ibid.

is commonly accepted as the preferable style for the purpose of remediating reversal problems and difficulty with confusing similiar letters such as n and h. Alice McKenna in her article "Some Notes on the Teaching of Handwriting" discusses the advantages of joined manuscript for the purpose of eliminating reversals.[29] However, this style is different from the model script. It would appear that the model script's lower case letters are based primarily on the cursive, while joined manuscript is pretty much just what it says. Also, the model script has been specifically designed to make handwriting easier for a child who has a handwriting disability.

The teacher of learning disabled children usually finds that the problem he faces is not how to teach a new skill, but how to remedy problems in skills already being used by his students. The following are four ways in which specific handwriting skills can be improved.

Alan M. Hofmeister in his article entitled "Let's Get It Write"[30] presents a technique for correcting what he calls the five errors in teaching writing. These errors are: "(1) massed practice without supervision; (2) no immediate feedback given; (3) emphasis on rote practice rather than discrimination; (4) failure to provide good models; (5) no differentiation between good and poor work."[31] This technique is called progressive

---

[29]Alic McKenna, "Some Notes on the Teaching of Handwriting," in Building Handwriting Skills in Dyslexic Children, ed. by John I. Arena (San Rafael, California: Academic Therapy Pub., 1970), p. 57.

[30]Alan M. Hofmeister, "Let's Get It Write," Teaching Exceptional Children VI (Fall, 1973), 30.

[31]Ibid.

approximation approach program and is conducted in the following manner: The child is given a typical worksheet with a model of letters or words across the top and with room below for practice. The child copies the word or letters immediately below the model. The teacher then corrects the child's work by writing over his letters with a transparent felt-tip marker. The child then erases the letters he has done incorrectly and traces over the teacher's letters done in marker. The child moves down to the next line and copies from above, and the procedure repeats itself.[32] This technique has been used successfully with two groups and may be helpful with other youngsters.[33]

Another technique for improving handwriting is one designed especially for brain-injured children who are characterized by their strict concentration and rigid, tense bodies. John Carter and Donald Synolds in "Effects of Relaxation Training upon Handwriting Quality" describe how the handwriting of thirty-two boys classified as minimally brain-injured was improved through a relaxation program.[34] These boys had a normal or above intelligence, but had learning difficulties attributed to a neurological condition. They were given a program telling them how to relax, then were asked to copy from a blackboard. This procedure was repeated three times a week for four weeks. The results showed improvement during the experiment,

---

[32] Ibid., p. 31.

[33] Ibid., p. 32.

[34] John L. Carter and Donald Synolds, "Effects of Relaxation Training upon Handwriting Quality," Journal of Learning Disabilities, VII (April, 1974), p. 236.

and importantly, four months later the handwriting showed little sign of deteriorating to the pre-experiment style.[35]

Behavior modification has become an accepted technique among educators and others for obtaining a desired hehavior or response. The next two studies describe how behavior modification techniques were used and how they effected an improvement in handwriting.

The first case is described in an article entitled "Modifying Cluttered Handwriting."[36] In this case a left-handed eleven year old boy with an I.Q. of 61 on the Stanford-Binet Intelligence Scale had an almost illegible handwriting due to irregular spacing between the letters and words. All previous attempts to improve his spacing had failed until a procedure "based on response prompts and reinforcement of appropriate responses"[37] was used. In this procedure the boy was given a 3/4 inch square of colored construction paper and was told to place it directly to the right of each word and to start the following word immediatly to the right of the colored square. In the beginning the boy was praised by his classroom teacher for his attempts. The boy was then told to use the colored square every time he wrote. The teacher would only make occassional checks and praise the boy's efforts. After eight weeks he voluntarily gave up using the prompt and did not use it again. The boy's much improved

---

[35] Ibid., p. 239.

[36] Margaret C. McNees, Patrick M. McNees, and Benjamin B. Lahey, "Modifying Cluttered Handwriting," Academic Therapy, VIII (Spring, 1972), p. 293.

[37] Ibid., p. 294.

spacing continued even after he had stopped using the square of construction paper. The results of this case are important for two reasons: (1) It supports the use of response prompts and differential reinforcement in teaching and remediating handwriting. (2) The technique used required no more time and attention of the classroom teacher than a traditional method would require.[38]

Another behavior modification study was described in an article entitled "Improvement of Handwriting and Letter Recognition Skills: A Behavior Modification Procedure."[39] Here primary and social reinforcement combined with several instructional procedures were used to improve the identification and writing of letters by a six year old boy. The object of the experiment was to teach the boy to recognize the letters of his name and to print his name.[40] The boy was given instruction on a one-to-one basis by the experimenter for forty minutes after school. The instructional procedures included verbally labeling letters; tracing with pencils, pen and magic marker; touching and tracing with fingers over letters made from yarn; watching and discussing the functional act; copying and printing without a model.[41] Candy and verbal praise were used to reinforce correct responses. As a result of this experiment, the boy showed a marked

---

[38] Ibid., p. 295.

[39] Joyce Fauke, and others, "Improvement of Handwriting and Letter Recognition Skills: A Behavior Modification Procedure," Journal of Learning Disabilities, VI (May, 1973), p. 25.

[40] Ibid., p. 26.

[41] Ibid.

improvement in his handwriting, and follow-up testing indicated that the boy's handwriting remained improved.[42]

There were so many varibles in this experiment, that it would be impossible to determine if one technique was more responsible for improvment than another.[43] The boy involved was having behavior problems in class and was doing poorly in his academic work. The very fact that he was receiving special attention and help may have done a lot toward his improvement. His classroom teacher reported that in addition to a much more legible handwriting, his general classroom performance improved.[44]

Letter reversal is a problem which every elementary teacher sees in his students. How a teacher meets this problem depends upon how he views the problem. Smith and Lovitt in "The Educational Diagnosis and Remediation of Written b and d Reversal Problems: A Case Study" stated some educators believe that reversals are a result of slow physical development.[45] These non-interventionists feel that no attempt should be made to correct the problem, because as the child matures, the reversals will disappear. Other educators see reversals as problems in visual perception or visual-motor integration. These indirect interventionists are not concerned with correcting a specific problem such as a b and d reversal, but are concerned with a more general remediation such as training in visual perception or

---

[42] Ibid., p. 29.

[43] Ibid.

[44] Ibid., p. 28.

[45] Deborah Deutsch and Thomas C. Lovitt, "The Educational Diagnosis and Remediation Written b and d Reversal Problems: A Case Study," Journal of Learning Disabilities, VI (June-July, 1973), p. 356.

motor development.[46] Still other educators, direct interventionists, look at specific reversals and seek to correct these particular problems.[47] This approach was the one used by the authors, Smith and Lovitt in their case study. Here they sought to correct a reversal problem of a ten year old boy. By careful examination, they determined that his reversal problem was specifically concerned with b and d reversal; the most frequent error involving the initial or first d.[48] Thus, the authors concentrated on remediating only the initial d. In order to do this the experimenters showed the boy the word dam written on an index card. They had him read the word, name the initial letter and write the word. Then he was shown the word bam and told that he frequently wrote bam instead of dam. He was again asked to name the initial letter of the word dam and then write the letter d. Once the boy was able to correctly write the initial d, his difficulty with reversing the initial b and the final b and d corrected itself almost completely.

The reversal of b and d is unique from the reversal of other letters, because if the b is reversed it becomes a d and the d reversed becomes a b. Other letters when reversed look like just that, reversed letters. A reversed b or d, however, could change a word and thus, a sentence. Therefore, remediation of this reversal problem is especially important.

One final handwriting problem which should be mentioned here is that of the left handed handwriter. Left-handedness presents some problems

---

[46] Ibid., p. 357.

[47] Ibid.

[48] Ibid., p. 359.

uniquely its own. There was a time when being left-handed was viewed as being not only awkward, but socially unacceptable. Fortunately we have come to realize that being left-handed is a natural result of genetic determination and that to try and thwart a child's natural sidedness can have unfortunate results.[49] The teacher today is faced with the question of how he can best help a left-handed child learn to write.

In "Reading Help for Lefties"[50] and "Left-Handed Handwriting"[51] suggestions for teaching the left-handed writer are made. In both articles the handwriter is told to hold his pencil with his thumb and first finger, the second finger carrying the weight of the pencil. The writer rests his arms so that his forearms form a triangle with the edge of the desk. The paper then is placed parallel with the writing arm.[52] The two articles differ, however, on the how the letters should slant. According to Ramos, a back-hand slant would be natural to a left-handed individual and should be expected.[53] Enstrom and Enstrom stress teaching the left-handed writer the technique of a right-handed slant.[54] Perhaps Enstrom and Enstrom stress

---

[49]Dean Trembly, "Should Your Child Write with the Left Hand?" in Building Handwriting Skills in Dyslexic Children, ed. by John I. Arena (San Rafael, California: Academic Therapy Publications, 1970), p. 112.

[50]E.A. Enstrom and Doris C. Enstrom, "Reading Help for Lefties," Reading Teacher, XXV (October, 1971), p. 41.

[51]Randy Ramas, "Left-Handed Handwriting," in Building Handwriting Skills in Dyslexic Children, ed. by John I. Arena (San Rafael, California: Academic Therapy Publications, 1970), p. 83.

[52]Ibid.

[53]Ibid.

[54]Enstrom and Enstrom, op.cit., p. 43.

this rightward slant, because it better fits the left to right eye movement required in reading.

It should be noted that in spite of our more modern attitude, some children who are naturally left-sided are still being pressed to become right-sided. This pressure may come from parents, teachers, or from a child's right-handed peers.[55] A naturally left-sided individual who becomes right-handed may suffer many adverse effects, such as problems in reading, writing, and speech.[56] Letter reversal is a problem which may occur as the result of such crossed dominance.[57] Thus, to the teacher of a child with a learning problem, determining his natural sidedness may be a key to his learning difficulties.

---

[55]Trembly, op.cit., p. 112.

[56]Ibid., p. 110.

[57]Ibid.

CHAPTER III

SUMMARY

If an educator could stand back and view the whole broad subject of handwriting problems, he would note some advances or changes which he could well applaud. At the same time, however, he would see many areas in this subject which are still unexplained and in need of researching.

When educators began to abandon the old terminology, in this case agraphia and dysgraphia, and to use more descriptive and practical terms for specific learning problems, they were making a great advancement toward finding ways to remediate the disabilities. Now a child's problem is described as being a b and d reversal, or poor spacing, or poor letter approximation. No more are teachers satisfied with a vague term like dysgraphia.

In this paper, some very specific techniques were discussed for correcting handwriting problems. A new type of handwriting script was described which is designed to meet the needs of children with specific handwriting difficulties. The technique of progressive approximation was presented to correct the errors frequently seen in teaching handwriting, and the results of relaxation techniques for helping brain-injured children obtain a more legible script were described. Behavior modification was used in two studies; in one it corrected a spacing problem and in another it helped letter recognition and approximation. An interesting solution to a b and d reversal problem was detailed in another study, and finally

some suggestions for instructing the left-handed writer on how to write were brought out.

Studies and new techniques such as those described here are vital if children with handwriting disabilities are to gain proficiency in this skill.

At the same time, however, it would be a mistake to be so involved with correcting a b and d reversal, or mirror writing, or a spacing problem that the causative factors for such problems are ignored and no research is done which might prevent such problems in the first place. The terms agraphia and dysgraphia would appear to be more closely associated with those professions such as the medical profession which concern themselves more with the physical causes of handwriting and other learning difficulties. The educator's lack of interest in this side of handwriting problems is evidenced by the fact that when the author of this research paper requested a listing of abstracts on dysgraphia form ERIC, (Educational Resources Information Center) the computer reported none available. Abstracts were available under the subject handwriting problems only.

The educator is justified in feeling a sense of satisfaction about the more practical approach that his profession is taking in remediating handwriting problems. Nevertheless, he must urge other professions to probe into the mysteries of the human neurological system in order to find the answers to why the disability has occurred, while he seeks more effective methods of teaching handwriting to counteract the specific learning problem.

BIBLIOGRAPHY

Books

Bannatyne, Alexander. Language, Reading and Learning Disabilities, Psychology, Neuropsychology, Diagnosis and Remediation. Springfield Illnosis: Charles C. Thomas Co., 1971.

Benton, A.L. Right-Left Discrimination and Finger Localization Development and Pathology. New York: Paul C. Hasbner Co., 1959.

Frierson, Edward C. and Barbe, Walter B. Educating Children with Learning Disabilities: Selected Readings. New York: Appleton-Century-Crafts, Meredith Corp., 1967.

Hewett, Frank. Education of Exceptional Learners. Boston: Allyn and Bacon, Inc., 1974.

Johnson, Doris J. and Myklebust, Helmer R. Learning Disabilities. New York: Grune and Stratton, 1967.

Lerner, Janet W. Children with Learning Disabilities. Boston: Houghton Mifflin Co., 1971.

Levine, Norman and Carter, Joan. "Handwriting for the Learning Disabled." Building Handwriting Skills in Dyslexic Children. Edited by John I. Arena. San Rafael, California: Academic Therapy Publications, 1970.

Myklebust, Helmer R. Development and Disorders of Written Language. Vol. II: Studies of Normal and Exceptional Children. New York: Grune and Stratton, 1973.

Ramas, Randy. "Left-Handed Handwriting." Building Handwriting Skills in Dyslexic Children. Edited by John I. Arena. San Rafael, California: Academic Therapy Publications, 1970.

Trembly, Dean. "Should Your Child Write with the Left Hand?" Building Handwriting Skills in Dyslexic Children. Edited by John I. Arena. San Rafael, California: Academic Therapy Publications, 1970.

Waugh, Kenneth W. and Bush, Wilma Jo. Diagnosing Learning Disorders. Columbus, Ohio: Charles E. Merrill, 1971.

Journals

Bannatyne, A. "Mirror-Images and Reversals." Academic Therapy, VIII (Fall, 1972), 87-92.

Benson, Frank, M.D. "Graphic Orientation Disorders of Left Handed Children." Journal of Learning Disabilities, III (March, 1970), 126-131.

Brown, George W. "Words and Things." Journal of Learning Disabilities, V (December, 1972), 572-575.

Carter, John L. and Synolds, Donald. "Effects of Relaxation Training upon Handwriting Quality." Journal of Learning Disabilities, VII (April, 1974), 53-55.

Deutsch, Deborah and Lovitt, Thomas C. "The Educational Diagnosis and Remediation of Written b and d Reversal Problems: A Case Study." Journal of Learning Disabilities, VI (June-July, 1973), 356-363.

Enstrom, E.A. and Enstrom, Doris. "Reading Help for Lefties." Reading Teacher, XXV (October, 1971), 41-44.

Fauke, Joyce; Burnett, Joseph; Powers, Mary Ann; Sulzer-Azaroff, Beth. "Improvement of Handwriting and Letter Recognition Skills: A Behavior Modification Procedure." Journal of Learning Disabilities, VI (May, 1973), 25-29.

Hofmeister, Alan M. "Let's Get It Write." Teaching Exceptional Children, VI (Fall, 1973), 30-33.

Joseph, Florence and Mullins, Jane. "A Script to Supplant Cursive Writing or Printing." Teaching Exceptional Children, III (Fall, 1970), 23-31.

McNess, Margaret C.; McNess, Patrick M.; Lahey, Benjamin B. "Modifying Cluttered Handwriting." Academic Therapy, VIII (Spring, 1972), 293-295.

Mullins, Jane; Joseph, Florence; Turner, Caroline; Zawadaski, Robert; Saltzman, Larry. "A Handwriting Model for Children with Learning Disabilities." Journal of Learning Disabilities, V (May, 1972), 308-311.